



Sports Equipment Decontamination and Odor Elimination: Case Study

Powerful efficacy with low toxicity. *PureX* chlorine dioxide from ORIN Technologies LLC.

The Challenge

Outbreaks of skin infections among athletes engaged in sports activities is an emerging health issue. The methicillin-resistant *Staphylococcus aureus* (MRSA) have recently garnered much of the attention in both the popular media and among health care professionals. While the general population is susceptible to MRSA outbreaks, individuals engaged in athletic events in which the participants are in close contact or share equipment may be at additional risk. A hockey player's body is entirely covered in sports gear, acting as a huge sponge for sweat. "Bacteria and certain types of fungi survive and reproduce wherever there is food (sweat), moisture and warmth."

(cited from:

http://www.explorecuriosity.org/DesktopModules/CC_VideoPlayer/wfrm/wfrmPrintDocument.aspx?contentid=357)

ORIN Technologies research partner worked with the Ohio AAA Bluejackets, they set out to reduce bacteria and fungi levels on players' equipment, as well as eliminate odors associated with hockey equipment. Treatment consisted of wetting the players equipment (helmet; shoulder, elbow, and shin pads; gloves; pants; and skates) with pure chlorine dioxide *PureX*, followed by a 1-hour gas treatment of *PureX*. Gear was left in the treated locker room overnight to dry. Swabs of various surfaces were taken before and after treatment, counting bacteria and fungi levels. The following pages report the results.

Results

Colony Forming Units (CFU)—number of individual colonies present in a sample

Compare to:

- 5,000 CFU of bacteria on an iPad
- 8,900 CFU of bacteria on a cell phone
- 940 CFU of bacteria on a public bathroom door
- 6,100 CFU of bacteria on a public toilet seat
- 90,000 CFU of bacteria on a taxi steering wheel





Cited from: <http://www.kare11.com/story/entertainment/television/programs/kare-11-extras/2012/11/08/cell-phones-found-with-more-bacteria-than-toilet-seat/3756705/andEnvironmentalSafetyTechlabresults.>)

1.

	Helmet	Pre-Treatment	Post Treatment
A	CFU Bacteria	450,000,000	0
	CFU Fungi	4,100	0
	Inside Glove	Pre-Treatment	Post Treatment
B	CFU Bacteria	190,000,000	0
	CFU Fungi	600	0
	Shin Guard	Pre-Treatment	Post Treatment
C	CFU Bacteria	245,000,000	3,500
	CFU Fungi	250,000	100

2.

	Helmet	Pre-Treatment	Post Treatment
A	CFU Bacteria	700,000,000	20,000
	CFU Fungi	4,100	0
	Chest Protector	Pre-Treatment	Post Treatment
B	CFU Bacteria	310,000	0
	CFU Fungi	8,000	0
	Inside Glove	Pre-Treatment	Post Treatment
C	CFU Bacteria	35,000,000	100
	CFU Fungi	200	0
	Shin Guard	Pre-Treatment	Post Treatment
D	CFU Bacteria	5,100,000	1,200
	CFU Fungi	45,000	0





3.

	Chest Protector	Pre-Treatment	Post Treatment
A	CFU Bacteria	202,000,000	32,000
	CFU Fungi	73,000	0

	Shin Guard	Pre-Treatment	Post Treatment
B	CFU Bacteria	22,000,000	100
	CFU Fungi	6,000	0

	Inside Skate	Pre-Treatment	Post Treatment
C	CFU Bacteria	31,500,000	3,300
	CFU Fungi	16,800	0

In Summary

Personal equipment showed dangerous levels of both bacteria and fungi. Common pathogens included in these population levels include:

- Athlete’s Foot
- Norovirus
- E Coli
- MRSA
- Rhinovirus
- Influenza-A

The combined treatments of both liquid and gas forms of *PureX* proved beneficial to eliminating odors and dangerous levels of bacteria and fungi on personal sporting equipment.

Recommended protocol for personal sports equipment

Athletes should thoroughly wet down (spray) personal equipment with ORIN’s *PureX* chlorine dioxide and allow to air dry after each use to reduce the bacteria and fungi colony forming units.

PureX will also further aid in odor elimination and atmospheric decontamination.

